



Federal Aviation Administration

Memorandum

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From: Richard E. Jennings, Acting Manager, Design Manufacturing, &
Airworthiness Division, AIR-100 *R. Jennings*

Timothy W. Shaver, Manager, Aircraft Maintenance Division, AFS-300 *Timothy W. Shaver*

Prepared by: Alejandro Rodriguez, Aerospace Engineer, Aircraft Certification, AIR-132

Subject: Effect of ADS-B Out installation on RVSM and TCAS II Certification

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The purpose of this memorandum is to explain the Federal Aviation Administration's (FAA's) policy regarding the effect an installation of an Automatic Dependent Surveillance-Broadcast (ADS-B) OUT system has on the existing Reduced Vertical Separation Minima (RVSM) and Traffic Collision Avoidance System (TCAS) II certification of civil aircraft.

Does the installation of an ADS-B Out system affect the airworthiness of an existing RVSM system?

No, the installation of an ADS-B Out System (TSO-C166b or TSO-C154c) has no effect on the airworthiness of RVSM systems. While installation of ADS-B capability to a system involves modification or replacement of the transponder, the transponder does not contribute to airplane altitude keeping performance. As such, if the transponder is not listed as an RVSM critical component in the approved RVSM system design or the RVSM instructions for continued airworthiness, then changing the make or model of transponder may be accomplished as a minor alteration to the RVSM system. However, a number of RVSM Type Certificate/Supplemental Type Certificate (TC/STC) holders may have been required to identify transponders as RVSM-critical components in associated certification documentation or maintenance procedures during the certification process.

Is a transponder a critical component of RVSM?

Although some RVSM TC/STC holders may have been required to identify specific transponder part numbers as RVSM critical components, we have since determined that any transponder meeting the performance requirements of TSO-C74() or TSO-C112() provides acceptable performance for RVSM operations. In the context of an RVSM approval, the purpose of the transponder is only to output altitude for RVSM monitoring, in addition to its basic air traffic

control function. As long as the ADS-B Out enabled transponder continues to report the RVSM altitude, the integrity of the RVSM approval is maintained. When applying the rest of the guidance in this memo on RVSM, applicants and installers may consider this as supporting data for the use of transponders other than those listed as RVSM critical components in RVSM TCs, STCs, and instructions for continued airworthiness.

Does the RVSM certification need to be amended if the transponder was declared a critical component?

If the TC or STC for the RVSM system has a limitation or condition requiring the use of specific transponder part numbers as RVSM critical components, then use of a different transponder requires that limitation or condition to be addressed. This may be done as follows:

- If the ADS-B Out TC or STC design data includes a process to evaluate the equivalency of the transponder function in the RVSM system, that process would be considered FAA-approved and when followed constitutes FAA approval to show the new transponder as an additional part number approved for RVSM (in addition to those listed on the RVSM TC or STC).
- If the ADS-B Out TC or STC does not include a process to evaluate the equivalency of the transponder function in the RVSM system, the installer may work with the RVSM TC or STC holder to amend the RVSM TC or STC to either add the new transponder make, model, and/or part number, or remove the identification of the transponder by make, model, and/or part number as a critical component in the RVSM certification documentation.
- Alterations of individual aircraft to use a transponder part number other than those identified as RVSM critical components in the RVSM TC or STC limitations and conditions are major alterations. These alterations must document the data supporting the use of the new transponder part number for RVSM on FAA Form 337, Block 8.

Does the RVSM maintenance program manual need to be amended when installing ADS-B Out?

If an operator's maintenance procedures identify a transponder by make, model, and/or part number as an RVSM critical component, then the RVSM program must be revised. This change may be accomplished using the standard procedures for program revision and submitted to the FAA for acceptance or approval as appropriate. The FAA may grant this revision without further compliance showing to remove the identification of the transponder by make, model, and/or part number as a critical component.

Does upgrading an existing Mode S transponder to include ADS-B Out functionality affect the airworthiness of an existing TCAS II system?

The addition of ADS-B Out functionality to an approved TCAS II system involves the modification of the transponder. As stated in Section 3-6, subparagraph c, of AC 20-151B, Mode S Transponder Tests, typical testing associated with the initial installation and certification of a new transponder may not be necessary when upgrading a previously approved transponder.

Examination of the proposed transponder upgrade should be accomplished to determine which tests in AC 20-151B are necessary and appropriate. When upgrading an existing approved Mode S transponder installation to add ADS-B Out functionality and the upgrade is only a software change, then no additional certification flight tests are required to support a follow-on STC, amended STC, or amended TC.

If you have any questions about this memorandum please contact Alejandro Rodriguez, AIR-132, or James Marks, AFS-360, at (202)-267-1575.

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